



TECHNICAL NOTE

Plant Testing for Agriculture

Plant tissue analysis reports mineral nutrient and trace element concentrations or feed quality of forage for animal nutrition.

Why Test Plants?

Plant nutrient levels are used to identify nutrient deficiency or toxicity and to monitor the effectiveness of the fertiliser programme. They also highlight mineral imbalances that might be affecting the health of pasture or animals that feed on it. This information can then be used to make appropriate fertiliser recommendations.

Herbage tests of pasture complement soil tests and allow important trace nutrients like cobalt, selenium, copper and iodine to be adjusted for improved animal health. The concentration of trace elements such as cobalt, zinc and copper in plant tissue is different for different plant species growing in the same environment. Element levels in plant tissue are also influenced by environmental factors such as soil pH and other factors that cannot be included in standard soil tests such as physical soil quality limitations (compaction), soil moisture, temperature and interactions between elements.

Using both herbage and soil testing will provide a better overall picture of the farm nutrient status than using either test method alone. Analysis of the clover content of pasture is recommended where there are any concerns about clover vigour or the clover content of pastures.

Taking Pasture Samples

- For pasture samples collect at least 500gm of actively growing herbage tissue from across each main grazing area.
- **Sample paddocks 'ready for grazing'** using clean scissors or shears, taking 20 handfuls of herbage in a diagonal line across the sample area and combine into one plant sample bag.
- Ensure the sample is representative of what the animals are eating and to help avoid soil contamination, cut at the grazing height (about 5cm above the ground).
- **Avoid dung and urine spots, troughs, stock camps, fence lines, shelter trees and recently grazed pastures and do not sample within three months of applying fertilizer or lime.**
- Traces of soil or chemicals (such as drench) on your hands will contaminate test results.
- To reduce the risk of sample contamination, Hill Laboratories has available Pasture Shears with side walls to hold the pasture sample for transfer to the sample bag. These pasture shears reduce the risk of sample contamination and can be purchased from the laboratory, telephone (07) 858 2000.
- Sampling at the same time of the year in the same way will give better results.
- If you require tests for 'Dry Matter' or 'Feed', samples collected must be sealed in airtight Feed sample bags after squeezing out the air.

Sampling Forage Crops

- There are Crop Guides with sampling guidelines for mineral testing of crops like lucerne, barley, kale, oats, wheat, maize, swede, turnips and choumoellier.
- Please telephone the Laboratory on 07 858 2000 or see the Publications section of our website www.hill-labs.com to refer to these Crop Guides.
- Feed tests can be selected when forage crops are harvested, by collecting **500–1000gm** of freshly cut material from a number of hand grab samples.
- Feed tests can also be selected on standing forage crops by cutting a number of plants down to grazing height and cutting and mixing the sample well to give a representative sample. Send in **500–1000gm** for each sample.
- **Place samples for Feed Testing straight away into an airtight Feed sample bag and squeeze out the air before sealing.**
- The Feed Test Kit has more details on collecting representative samples of forage and silage crops.

What Tests to Order?

- The **Basic Plant Profile (BP)** includes analysis of nitrogen, phosphorus, potassium sulphur, calcium, magnesium, sodium, iron, manganese, zinc, copper and boron.
- The **Mixed Pasture Profile (MPast)**, which can be taken at any time of the year, includes a full mixed pasture test with added chloride, crude protein (CP), digestibility and metabolisable energy (ME).
- The **Animal Dietary Mineral Balance (ADMB)** Report is a free report that can be requested on all Mixed Pasture nutrient tests. This report shows the animal requirements and dietary intake per nutrient for a specific livestock class. Ask for the ADMB Report and supply details of the animals being fed.
- Other pasture test options are included in the **Pasture Feed Quality Analysis** services offered sheet.
- Forage crops such as kale, triticale, lucerne and oats can be analysed for mineral content. For example, as an animal feed crop, kale would be given a Basic Plant Profile with added cobalt, molybdenum and selenium.
- Forage crops can also be tested for the **Feed Profile (Feed)** where the digestibility, crude protein, fibre levels including lignin, soluble sugars, starch, crude fat, ME and dry matter levels are analysed to measure the feed quality.

Pasture Feed Quality with Mineral Analysis [Extended Feed Profile]

There will be times when you need a complete picture of your pasture or forage crop, especially when metabolic disorders are an issue and you're supplementing pasture with other feeds. Hill Laboratories provides the comprehensive **Extended Feed Profile (ExtFed)**, which combines the Mixed Pasture Profile with the Feed Profile.

The Extended Feed Profile includes analysis of the minerals: nitrogen, phosphorus, potassium, sulphur, calcium, magnesium, sodium, iron, manganese, zinc, copper, boron, cobalt, molybdenum, selenium and chloride, with the feed quality tests dry matter, crude protein, ash, acid detergent fibre (ADF), neutral detergent fibre (NDF), lignin, soluble sugars, starch, crude fat, ME and digestibility.

Clover-Only Testing

To determine why your pasture is not growing well, a clover-only sample is recommended. Healthy clover is the main source of nitrogen for pasture growth and clover develops mineral deficiencies before problems appear in grass.

Using clean scissors sample at least 100 clover leaves with stems, selecting from small, stunted plants or plants with unusual leaf colour. One or more clover-only samples per farm, collected from the poorest growing parts of the farm, will usually be sufficient. Request a **Clover Only Profile (Clov)**, which consists of the Basic Plant Profile with additional Molybdenum (Mo) test, for the clover-only sample. Use a plant sample bag.

Additional Tests

- Stock being fed annual ryegrass, oats, sorghum or brassicas can be susceptible to nitrate poisoning and a nitrate test can be added to any of the above test profiles. The weed content of forage crops may also contain high nitrate levels, so **samples submitted for nitrate analysis should represent the animals diet.**
- Or if you are concerned that your pasture may be deficient in iodine, then we can analyse this mineral too.



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Checklist

Test Options	Sample Type	Sample Size	Correct Sample Bags
	Pasture Mineral Tests	At Least 500gm	Plant Sample Bag
Mixed Pasture Profile (MPast)	Nitrogen, Phosphorus, Potassium, Sulphur, Calcium, Magnesium, Sodium, Iron, Manganese, Zinc, Copper, Boron, Molybdenum, Cobalt and Selenium + Chloride + Metabolisable Energy (ME) + Crude Protein		
Complete Pasture Profile (CPP)	1 x Mixed Pasture Profile + ME + Crude Protein 1 x Clover Only Profile		
	Clover-Only Test	At Least 100 Leaves & Stems	Plant Sample Bag
Clover Only Profile (Clov)	Nitrogen, Phosphorus, Potassium, Sulphur, Calcium, Magnesium, Sodium, Iron, Manganese, Zinc, Copper, Boron and Molybdenum		
	Forage Feed Tests	500-1000gm	Feed Sample Bag
Feed Profile (Feed)	Dry Matter (DM), Crude Protein, Ash, Acid Detergent Fibre, Neutral Detergent Fibre, Lignin, Soluble Sugars, Starch, Crude Fat, ME and Digestibility		
Extended Feed Profile (ExtFed)	Feed Profile + Mixed Pasture Profile + Chloride		
Dry Matter + ME Profile (DMME)	Dry Matter (DM) + Metabolisable Energy (ME) + Crude Protein (CP)		
Dry Matter Only (DM)	Dry Matter only		
	Silage Tests Ensiled for at least 2 weeks	500-1000gm	Feed Sample Bag
Silage Profile (Silage)	pH, Dry Matter, Crude Protein, Soluble Sugars, Starch, Ash, Acid Detergent Fibre, Neutral Detergent Fibre, Lignin, Crude Fat, ME, Digestibility, Ammonium-N, Ammonium-N:Total N and Lactic Acid		
Volatile Fatty Acids Profile (VFA)	Acetic, Butyric, Propionic and Formic Acids		
Silage Profile + VFA (SilageVFA)	Silage Profile + VFA Profile		
Extended Silage Profile (ExtSil)	Silage Profile + Minerals (Nitrogen, Phosphorus, Potassium, Sulphur, Calcium, Magnesium, Sodium, Chloride, Iron, Manganese, Zinc, Copper, Boron, Molybdenum, Cobalt and Selenium)		
Extended Silage Profile + VFA (ExtSilVFA)	Silage Profile + (Nitrogen, Phosphorus, Potassium, Sulphur, Calcium, Magnesium, Sodium, Chloride, Iron, Manganese, Zinc, Copper, Boron, Molybdenum, Cobalt, Selenium) + VFA		

How to Order a Test

Hill Laboratories recommends you use a consultant or fertiliser specialist to oversee your soil and plant testing program. However, you can order a **free Soil & Plant Test Kit or Feed Test Kit** (including sample bags, a courier bag, instructions and a sample request form) from our website www.hill-laboratories.com. Sample kits are also available from your rural supplies store.

Please Note:

- **A full sample bag is needed, particularly where mineral testing is also selected.**
- **For accurate dry matter results an airtight sealed bag is necessary.**
- **Samples should be sent to the laboratory as soon as collected (courier preferred), or stored overnight in a refrigerator if this is not possible.**
- **Tick the appropriate boxes on the request form to ensure you receive the desired testing.**